1 Identification

- Product identifier
  - Trade name: trans-Resveratrol-d4
  - Article number: 13130
- Application of the substance / the mixture
  This product is for research use - Not for human or veterinary diagnostic or therapeutic use. It is the responsibility of the purchaser to determine suitability for other applications.
- Details of the supplier of the safety data sheet
  - Manufacturer/Supplier: Cayman Chemical Co.
  - 1180 E. Ellsworth Rd.
  - Ann Arbor, MI 48108
  - USA
  - Information department: Product safety department
  - Emergency telephone number:
    - During normal opening times: +1 (734) 971-3335
    - US/CANADA: 800-424-9300
    - Outside US/CANADA: 703-741-5970

2 Hazard(s) identification

- Classification of the substance or mixture
  - GHS02 Flame
    Flam. Liq. 2  H225 Highly flammable liquid and vapor.
  - GHS08 Health hazard
    Carc. 1A    H350 May cause cancer.

- Label elements
- GHS label elements
  The product is classified and labeled according to the Globally Harmonized System (GHS).
Hazard pictograms

GHS02  GHS08

Signal word

Danger

Hazard statements

H225 Highly flammable liquid and vapor.
H350 May cause cancer.

Precautionary statements

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ventilating/lighting/equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P403+P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:

NFPA ratings (scale 0 - 4)

Health = 0
Fire = 3
Reactivity = 0

HMIS-ratings (scale 0 - 4)

HEALTH 0
Fire = 3
Reactivity = 0

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.
vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixtures

Description: Mixture of the substances listed below with nonhazardous additions.
### 4 First-aid measures

**Description of first aid measures**
- **General information:** Immediately remove any clothing soiled by the product.
- **After inhalation:** Supply fresh air; consult doctor in case of complaints.
- **After skin contact:** Immediately rinse with water.
- **After eye contact:** Rinse opened eye for several minutes under running water.
- **After swallowing:** If symptoms persist consult doctor.
- **Information for doctor:**
  - **Most important symptoms and effects, both acute and delayed**
    May cause anemia, cough, CNS depression, drowsiness, headache, heart damage, lassitude (weakness, exhaustion), liver damage, narcosis, reproductive effects, teratogenic effects.
  - **Indication of any immediate medical attention and special treatment needed**
    No further relevant information available.

### 5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
  - CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Special hazards arising from the substance or mixture**
  No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:** No special measures required.

### 6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
  - Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:**
  - Dilute with plenty of water.
  - Do not allow to enter sewers/surface or ground water.
- **Methods and material for containment and cleaning up:**
  - Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  - Dispose contaminated material as waste according to item 13.
  - Ensure adequate ventilation.
- **Reference to other sections**
  - See Section 7 for information on safe handling.
  - See Section 8 for information on personal protection equipment.
  - See Section 13 for disposal information.
- **Protective Action Criteria for Chemicals**

**PAC-1:**

<table>
<thead>
<tr>
<th>CAS</th>
<th>Substance</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>64-17-5</td>
<td>ethanol</td>
<td>1,800 ppm</td>
</tr>
</tbody>
</table>
Trade name: trans-Resveratrol-d4

7 Handling and storage

· Handling:
  · Precautions for safe handling
    Ensure good ventilation/exhaustion at the workplace.
    Open and handle receptacle with care.
  · Information about protection against explosions and fires:
    Keep ignition sources away - Do not smoke.
    Protect against electrostatic charges.
    Keep respiratory protective device available.
  · Conditions for safe storage, including any incompatibilities
  · Storage:
    · Requirements to be met by storerooms and receptacles: Store in a cool location.
    · Information about storage in one common storage facility: Not required.
  · Further information about storage conditions:
    Keep receptacle tightly sealed.
    Store in cool, dry conditions in well sealed receptacles.
  · Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

· Additional information about design of technical systems: No further data; see item 7.
· Control parameters
  · Components with limit values that require monitoring at the workplace:
    | Ethanol (64-17-5) |
    |-------------------|
    | PEL | Long-term value: 1900 mg/m³, 1000 ppm |
    | REL | Long-term value: 1900 mg/m³, 1000 ppm |
    | TLV | Short-term value: 1000 ppm |
    | A3  |
· Additional information: The lists that were valid during the creation were used as basis.
· Exposure controls
  · Personal protective equipment:
· General protective and hygienic measures:
  · Keep away from foodstuffs, beverages and feed.
  · Immediately remove all soiled and contaminated clothing.
  · Wash hands before breaks and at the end of work.
  · Store protective clothing separately.
· Breathing equipment:
  · In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
· Protection of hands:

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture. Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

· Material of gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

· Penetration time of glove material

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· Eye protection:

Tightly sealed goggles

<table>
<thead>
<tr>
<th>9 Physical and chemical properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Information on basic physical and chemical properties</td>
</tr>
<tr>
<td>· General Information</td>
</tr>
<tr>
<td>· Appearance:</td>
</tr>
<tr>
<td>Form: Fluid</td>
</tr>
<tr>
<td>Color: Colorless</td>
</tr>
<tr>
<td>· Odor: Alcohol-like</td>
</tr>
<tr>
<td>· Structural Formula: C H3 - C H2 - O H</td>
</tr>
<tr>
<td>· Molecular Weight: 114.1 g/mol</td>
</tr>
<tr>
<td>· Odor threshold: Not determined.</td>
</tr>
<tr>
<td>· pH-value: Not determined.</td>
</tr>
<tr>
<td>· Change in condition</td>
</tr>
<tr>
<td>Melting point/Melting range: -114.5 °C (-174.1 °F)</td>
</tr>
<tr>
<td>Boiling point/Boiling range: 78 °C (172.4 °F)</td>
</tr>
<tr>
<td>· Flash point: 13 °C (55.4 °F)</td>
</tr>
<tr>
<td>· Flammability (solid, gaseous): Not applicable.</td>
</tr>
<tr>
<td>· Ignition temperature: 425 °C (797 °F)</td>
</tr>
<tr>
<td>· Decomposition temperature: Not determined.</td>
</tr>
<tr>
<td>· Auto igniting: Product is not selfigniting.</td>
</tr>
<tr>
<td>· Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures are possible.</td>
</tr>
</tbody>
</table>

(Contd. on page 6)
53.1.8

· Explosion limits:
  Lower: 3.5 Vol %
  Upper: 15 Vol %

· Vapor pressure at 20 °C (68 °F): 59 hPa (44.3 mm Hg)

· Density at 20 °C (68 °F): 0.79 g/cm³ (6.59255 lbs/gal)
  · Relative density Not determined.
  · Vapor density Not determined.
  · Evaporation rate Not determined.

· Solubility in / Miscibility with Water at 20 °C (68 °F): 1,000 g/l

· Partition coefficient (n-octanol/water): Not determined.

· Viscosity:
  Dynamic at 20 °C (68 °F): 1.2 mPas
  Kinematic: Not determined.

· Solvent content:
  Organic solvents: 99.9 %
  VOC content: 99.90 %
  999.0 g/l / 8.34 lb/gal

· Solids content: 0.0 %

· Other information No further relevant information available.

10 Stability and reactivity

· Reactivity No further relevant information available.

· Chemical stability

· Thermal decomposition / conditions to be avoided:
  No decomposition if used according to specifications.

· Possibility of hazardous reactions No dangerous reactions known.

· Conditions to avoid No further relevant information available.

· Incompatible materials: Strong oxidizing agents

· Hazardous decomposition products: Carbon oxides

11 Toxicological information

· Information on toxicological effects

· Acute toxicity:

· LD/LC50 values that are relevant for classification:

  64-17-5 ethanol

<table>
<thead>
<tr>
<th></th>
<th>Oral</th>
<th>Dermal</th>
<th>Inhalative</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDLO</td>
<td>1.14 ml/kg (man)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>7,060 mg/kg (rat)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TDLO</td>
<td>650 (man)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>40,000 mg/kg (rat)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50/4 h</td>
<td>5,900 mg/m³ (rat)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>20,000 mg/m³/10h (rat)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Trade name: trans-Resveratrol-d4

<table>
<thead>
<tr>
<th></th>
<th>TCLO</th>
<th>1,800 mg/m³/30m (hmn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCLO</td>
<td>29,300 mg/m³/7h (mouse)</td>
<td></td>
</tr>
<tr>
<td>TCLO</td>
<td>1,800 (hmn)</td>
<td></td>
</tr>
<tr>
<td>LC50</td>
<td>10 h - 20,000 mg/m³ (rat)</td>
<td></td>
</tr>
<tr>
<td>LD50 Inhalation TCLO</td>
<td>1,800 mg/m³/30m (hmn)</td>
<td></td>
</tr>
<tr>
<td>LC50/4 h</td>
<td>20,000 mg/l (rat)</td>
<td></td>
</tr>
</tbody>
</table>

Irritation of skin:
- Irritation 20 mg/24h (rabbit)
- TDLO 1,800 mg/kg (wmn)
- Intraperitoneal LD50 280 mg/kg (rat)
- Data 500 mg/24h (rabbit)

- Primary irritant effect:
  - on the skin: No irritant effect.
  - on the eye: No irritating effect.
  - Sensitization: No sensitizing effects known.
- Additional toxicological information:
The product shows the following dangers according to internally approved calculation methods for preparations:

- Carcinogenic categories
  - IARC (International Agency for Research on Cancer)
    - 64-17-5 ethanol 1
  - NTP (National Toxicology Program)
    - None of the ingredients is listed.
  - OSHA-Ca (Occupational Safety & Health Administration)
    - None of the ingredients is listed.

12 Ecological information

- Toxicity
  - Aquatic toxicity: No further relevant information available.
  - Persistence and degradability: No further relevant information available.
- Behavior in environmental systems:
  - Bioaccumulative potential: No further relevant information available.
  - Mobility in soil: No further relevant information available.
- Additional ecological information:
- General notes:
  Water hazard class 1 (Self-assessment): slightly hazardous for water
  Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
- Results of PBT and vPvB assessment
  - PBT: Not applicable.
  - vPvB: Not applicable.
- Other adverse effects: No further relevant information available.
13 Disposal considerations

· Waste treatment methods
· Recommendation: Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· Uncleaned packagings:
· Recommendation: Disposal must be made according to official regulations.
· Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

· UN-Number
· DOT, IMDG, IATA UN1170

· UN proper shipping name
· DOT Ethanol solutions
· IMDG ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)
· IATA Ethanol solution

· Transport hazard class(es)
· DOT

    ✖️

    · Class 3 Flammable liquids
    · Label 3

· IMDG, IATA

    ✖️

    · Class 3 Flammable liquids
    · Label 3

· Packing group
· DOT, IMDG, IATA II

· Environmental hazards: Not applicable.

· Special precautions for user
· Hazard identification number (Kemler code): 33
· EMS Number: F-E,S-D
· Stowage Category A

· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.
Trade name: trans-Resveratrol-d4

<table>
<thead>
<tr>
<th>· Transport/Additional information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>· DOT</td>
</tr>
<tr>
<td>· Quantity limitations</td>
</tr>
<tr>
<td>On passenger aircraft/rail: 5 L</td>
</tr>
<tr>
<td>On cargo aircraft only: 60 L</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>· IMDG</td>
</tr>
<tr>
<td>· Limited quantities (LQ)</td>
</tr>
<tr>
<td>1L</td>
</tr>
<tr>
<td>Code: E2</td>
</tr>
<tr>
<td>Maximum net quantity per inner packaging: 30 ml</td>
</tr>
<tr>
<td>Maximum net quantity per outer packaging: 500 ml</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>· IATA</td>
</tr>
<tr>
<td>· Remarks:</td>
</tr>
<tr>
<td>When sold in quantities of less than or equal to 1 mL, or 1 g, with an Excepted Quantity Code of E1, E2, E4, or E5, this item meets the De Minimis Quantities exemption, per IATA 2.6.10. Therefore packaging does not have to be labeled as Dangerous Goods/Excepted Quantity.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>· UN &quot;Model Regulation&quot;:</td>
</tr>
<tr>
<td>UN 1170 ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION), 3, II</td>
</tr>
</tbody>
</table>

### 15 Regulatory information

· Safety, health and environmental regulations/legislation specific for the substance or mixture

<table>
<thead>
<tr>
<th>· Sara</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Section 355 (extremely hazardous substances):</td>
</tr>
<tr>
<td>None of the ingredients is listed.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>· Section 313 (Specific toxic chemical listings):</td>
</tr>
<tr>
<td>None of the ingredients is listed.</td>
</tr>
</tbody>
</table>

· TSCA (Toxic Substances Control Act):  
| 64-17-5 ethanol | ACTIVE |

· Hazardous Air Pollutants  
None of the ingredients is listed.

· Proposition 65

| · Chemicals known to cause cancer: |
| None of the ingredients is listed. |

| · Chemicals known to cause reproductive toxicity for females: |
| None of the ingredients is listed. |

| · Chemicals known to cause reproductive toxicity for males: |
| None of the ingredients is listed. |

| · Chemicals known to cause developmental toxicity: |
| 64-17-5 ethanol |

· Carcinogenic categories

| · EPA (Environmental Protection Agency) |
| None of the ingredients is listed. |
Trade name: trans-Resveratrol-d4

TLV (Threshold Limit Value)
64-17-5 ethanol A3

NIOSH-Ca (National Institute for Occupational Safety and Health)
None of the ingredients is listed.

National regulations:

Information about limitation of use:
Workers are not allowed to be exposed to the hazardous carcinogenic materials contained in this preparation. Exceptions can be made by the authorities in certain cases.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information
All chemicals may pose unknown hazards and should be used with caution. This SDS applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this SDS. Cayman Chemical Company assumes no responsibility for incidental or consequential damages, including lost profits, arising from the use of these data. It shall be the user’s responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this SDS is based on technical data judged to be reliable, Cayman Chemical Company assumes no responsibility for the completeness or accuracy of the information contained herein.

Department issuing SDS: Environment protection department.
Contact: -
Date of preparation / last revision 08/03/2021 / -

Abbreviations and acronyms:
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Flam. Liq. 2: Flammable liquids – Category 2
Carc. 1A: Carcinogenicity – Category 1A

* Data compared to the previous version altered.